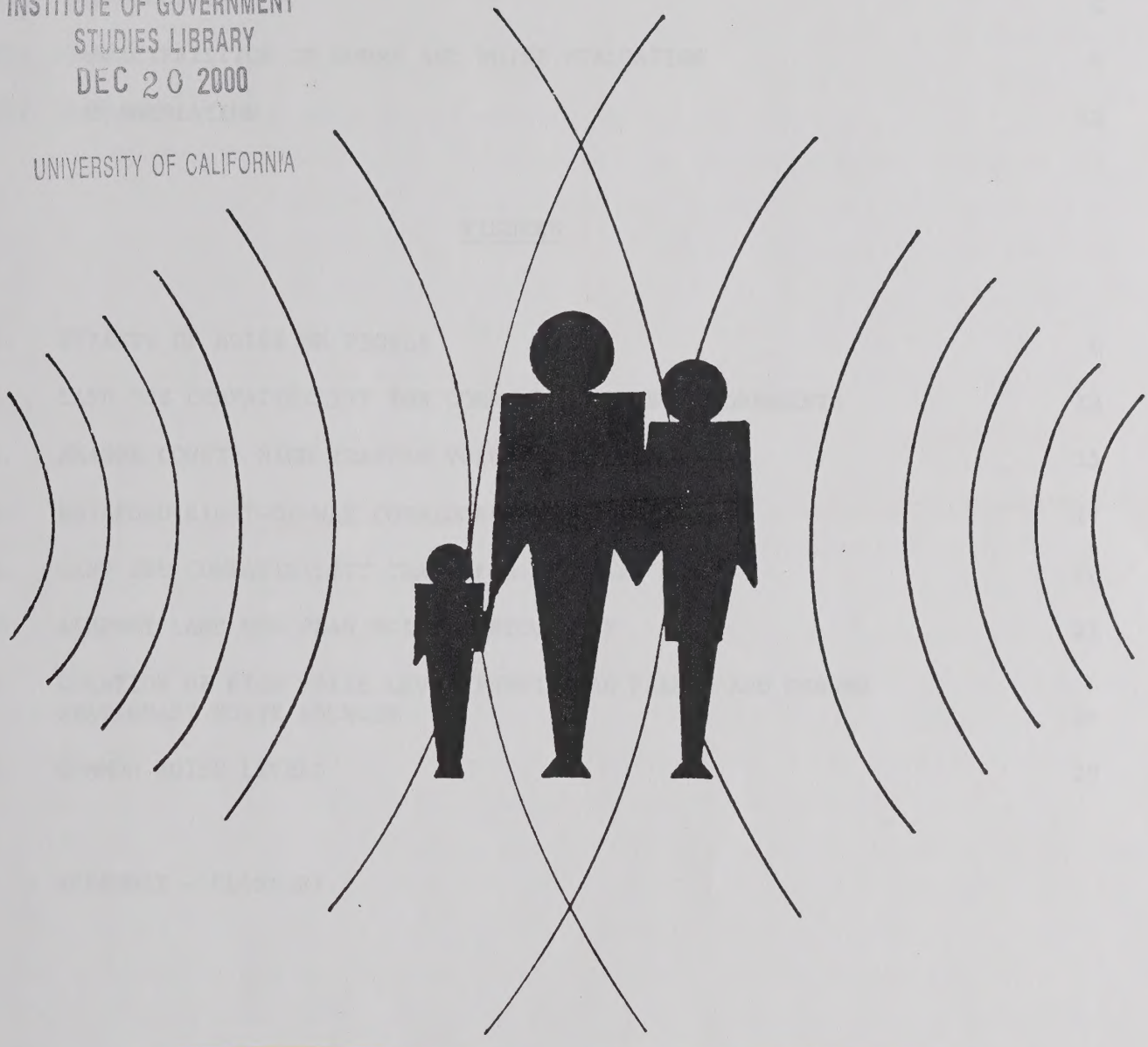
AMADOR COUNTY GENERAL PLAN

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NOISE ELEMENT

ADOPTED 1974

AMENDED 1988

Approved by Board of Supervisors
09/06/88

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APPENDIX - GLOSSARY

I. INTRODUCTION

The State Planning and Zoning Law requires every city and county in the State to adopt a general plan (Sections 65000 et seq.; Government Code). The plan must be made up of various elements which contain the County's written policies on matters ranging from land use classifications to seismic safety. The Code further requires a periodic review and updating of these elements along with continued internal consistency among all of the separate elements.

In recognition of the importance noise plays in our social environment, the State Legislature in 1971 mandated that one of these elements be a "noise element" to achieve noise compatible land uses in the general plan.

Amador County joined with the four counties and the several cities in the Central Sierra Planning Council to hire a planning consultant to prepare a combined noise element for the entire planning area. That element was eventually adopted in 1974 and was relied upon for the next fourteen years by the County in making land use determinations related to noise; especially when reviewing discretionary noise generating project applications coming before the Amador County Planning Commission and Board of Supervisors.

For planning purposes, noise can simply be defined as any unwanted or objectionable sound. Sound, which is more completely discussed later in this element, is merely the vibration of air molecules by either natural or man-made causes which affect the human ear. Sound becomes noise when the human ear is adversely affected by that sound. It has been scientifically proven that long-term exposure to excessive noise can, in the extreme, lead to physiological and psychological problems in humans. At the minimum, excessive noise can cause sleep disruption, speech interference, irritability and other similar manifestations on human activities. Eventually, excessive noise will lead to complaints or legal action.

Over years of public hearings, the County has found that project applications intending to locate a noise generator in close proximity to a noise receptor (or vice versa) will result in heated and controversial debates over the noise issue. The discussion usually centers on "who was there first" or "the overriding merits or value of each land use to the County as a whole". As communities grow and infilling takes place this noise issue inevitably comes to the forefront more and more often. The 1974 noise element accurately predicted such an eventual occurance:

> "Noise at or approaching problem magnitudes in the area is concentrated in the urban areas, at certain industrial operations, and along the corridors of transportation routes, air, rail and highway".

In 1974, existing environmental noise was not considered to be a major problem or planning issue in the County. The public hearings on the noise element, which were concurrently held with three other new general plan elements, were not

heavily attended by concerned citizens. The records indicate there were no speakers on the noise element. This is understandable for several reasons. At that time the County population was only about 12,000 persons. This has more than doubled in 1988 to over 25,000 persons. Because of this County growth and also a significant regional population growth, the traffic volumes on Highways 49 and 88 have more than doubled during this same time period. This is particularly true of Highway 88 since it was opened for year round use in 1972-73. The airport runway improvement project begun in 1976 has resulted in a substantial increase in air traffic; much more than was originally predicted. Existing industrial plants and commercial shopping centers have expanded and new sites have been approved. Likewise, residential projects have expanded into previously undeveloped areas. Recent traffic and airport noise studies prepared pursuant to the California Environmental Quality Act (CEQA) for individual projects indicate that cumulative noise regulation threshold levels will now be reached within predictable planning periods in certain urbanizing areas of the Cities and County.

For these reasons, the review and updating of several interdependant general plan elements is being done in the mid-1980's; including the noise element which is closely associated with the land use and circulation elements.

The statutorily required contents of a noise element are specified in Section 65302(f) of the State Planning and Zoning Law (Government Code):

> "(f) A noise element which shall identify and appraise noise problems in the community. The noise element shall recognize the guidelines established by the Office of Noise Control in the State Department of Health Services and shall analyze and quantify, to the extent practicable, as determined by the legislative body, current and projected noise levels for all of the following sources:
>
> (1) Highways and freeways.
>
> (2) Primary arterials and major local streets.
>
> (3) Passenger and freight on-line railroad operations and ground rapid transit systems.
>
> (4) Commercial, general aviation, heliport, helistop, and military airport operations, aircraft overflights, jet engine test stands, and all other ground facilities and maintenance functions related to airport operation.
>
> (5) Local industrial plants, including, but not limited to, railroad classification yards.
>
> (6) Other ground stationary noise sources identified by local agencies as contributing to the community noise environment.
>
> Noise contours shall be shown for all of these sources and stated in terms of community noise equivalent level (CNEL) or day-night average level (Ldn). The noise contours shall be prepared on the basis of noise monitoring or following generally accepted noise modeling techniques for the various sources identified in paragraphs (1) to (6), inclusive.

The noise contours shall be used as a guide for establishing a pattern of land uses in the land use element that minimizes the exposure of community residents to excessive noise.

The noise element shall include implementation measures and possible solutions that address existing and foreseeable noise problems, if any. The adopted noise element shall serve as a guideline for compliance with the state's noise insulation standards".

This element has been divided into three sections: The Introduction; The Characteristics of Sound and Systems of Noise Evaluation and Implementation. The Implementation section includes the goals, policies and standards of the noise element along with the relationship to the land use and circulation elements.

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II.

The Characteristics Of Sound And Systems Of Noise Evaluation

Sound is transmitted in a longitudinal wave-form. These waves are created by the compression and decompression of air molecules. For example, there is no sound in the vacuum of space as there are no air molecules to compress. The air particles, after being compressed, return to normal after the wave has passed until another comes along. This wave generation is a form of energy which is measurable by instruments in the same manner as light or radio waves.

Sound waves are relatively "long" when compared to other types of waves. This longer wave accounts for some of the characteristics peculiar to sound. Sound waves can be reflected, diffracted, transmitted and absorbed; which are important factors when considering noise abatement or attenuation.

Reflection is the rebounding of sound from a surface which does not absorb the sound. Most materials absorb some sound and reflect the remainder. Thus, Absorption would be defined as sound that is not reflected. The texture of an obstacle to a large degree determines the amount of sound absorption.

Sound that is not absorbed or reflected can be Diffracted or Transmitted. Sound can be transmitted through material such as a wall much the same as it passes through air. The denser and thicker the material, and thus the molecular structure, the less sound that can be transmitted. The reflection, absorption and transmission characteristics of sound are necessary in computations developing insulation or barrier mitigation measures.

The principle of diffraction is the sound characteristic which causes the most problems in mitigating unwanted noise. The longer waves of sound allow them to "bend around" an obstacle if not otherwise impeded. This characteristic reduces the effectiveness of barrier walls or vegetation.screens.

The fact that soundwaves are subject to air absorption and geometric spreading losses are the characteristics which lend themselves to the most effective noise mitigation measures; that of providing a distance buffer between the sound generator and the noise sensitive receptor. Spreading losses result from an expansion of the wave front as the sound travels from the source. This "ripple effect" gives a six decibel loss per doubling of distance. Air absorption is effected by frequency, temperature and relative humidity and is variable because of the difference in seasonal climatic conditions in Amador County.

Sound intensity is only relevant in this element in relation to the response of the human ear. The ear picks up sound only within a certain frequency range. The range is between 20 cycles per second (cps) and 20,000 cps. The ear is the most sensitive to frequencies between 2000 cps and 4000 cps. Higher or lower

frequencies do not register on the average human ear unless unusual conditions exist.

The sound intensity level ("L" in sound formulas) is the magnitude of the sound, not the "loudness". Loudness is an expression related to noise and is a subjective value given by a person to sound which can vary greatly from person to person. What is noisy or loud to one individual may not be to another. Scientific studies leading to the noise response charts used in this element are the result of averaging responses from a large number of people. That is, except for the physical damage which can be done to a human ear if the sound intensity level is extreme which is nearly the same for everyone.

The range of magnitude between the faintest audible sound and the loudest sound the ear can withstand is in very large numbers (a ratio of approximately 1,000,000 to 1). Because of this, that range of numbers expressing magnitude of sound is compressed by the use of log scales for easier use. Actually, to the average citizen not familiar with logarithms this log scale used for sound intensity can be very misleading. An analogous example is the more publicized use of log scales for rating earthquakes (Richter Scale). An earthquake of 8.0 is much more than just twice as powerful as one of 4.0 on a log scale. Decibels, the sound pressure rating used for measuring the intensity of noise, are understandable to the average, untrained person only when comparisons are made to well-known noise sources.

Decibels and A-weighted decibels are necessary to assess the impact of a noise source. They apply a measurement to a sound, which, when compared to an annoyance chart, give an indication of what public response can be expected. This could range from no response through sleep and speech interference, to an actual hearing loss. (see chart Figure 1)

The decibel rating is also amenable to relatively easy and accurate measurement with sound monitoring equipment.

The A-weighted decibel scale has a built-in allowance for the characteristics of the human ear such that the higher and lower frequencies are not valued as high on the dB(A) scale of a sound meter as perhaps on a straight sound pressure (dB) scale. Whereas a sound level might be 80 decibels of pure sound pressure on an unweighted scale, the pitch may be so low, and therefore less objectionable, that on the dB(A) scale it registers only 68. This will occur when the frequencies generated by a noise source are so low or so high they do not irritate the human ear as much as a frequency of, say around 2,000 cycles per second.

Because decibels are the result of a logarithmic function, decibel addition is not done by simple addition. To raise the noise level by 3 dB would require doubling the noise energy output.

TABLE D-1. EFFECTS OF NOISE ON PEOPLE
(Residential Land Uses Only)

Effects[1] / Day-Night Average Sound Level In Decibels	Hearing Loss	Speech Interference		Annoyance[2]	Average Community Reaction[4]	General Community Attitude Towards Area
		Indoor	Outdoor			
	Qualitative Description	% Sentence Intelligibility	Distance in Meters for 95% Sentence Intelligibility	% of Population Highly Annoyed[3]		
75 and above	May Begin to Occur	98%	0.5	37%	Very Severe	Noise is likely to be the most important of all adverse aspects of the community environment.
70	Will Not Likely Occur	99%	0.9	25%	Severe	Noise is one of the most important adverse aspects of the community environment.
65	Will Not Occur	100%	1.5	15%	Significant	Noise is one of the important adverse aspects of the community environment.
60	Will Not Occur	100%	2.0	9%	Moderate to Slight	Noise may be considered an adverse aspect of the community environment.
55 and below	Will Not Occur	100%	3.5	4%		Noise considered no more important than various other environmental factors.

1. "Speech Interference" data are drawn from the following tables in EPA's "Levels Document": Table 3, Fig. D-1, Fig. D-2, Fig. D-3. All other data from National Academy of Science 1977 report "Guidelines for Preparing Environmental Impact Statements on Noise, Report of Working Group 69 on Evaluation of Environmental Impact of Noise."
2. Depends on attitudes and other factors.
3. The percentages of people reporting annoyance to lesser extents are higher in each case. An unknown small percentage of people will report being "highly annoyed" even in the quietest surroundings. One reason is the difficulty all people have in integrating annoyance over a very long time.
4. Attitudes or other non-acoustic factors can modify this. Noise at low levels can still be an important problem, particularly when it intrudes into a quiet environment.

NOTE: Research implicates noise as a factor producing stress-related health effects such as heart disease, high-blood pressure and stroke, ulcers and other digestive disorders. The relationships between noise and these effects, however, have not as yet been quantified.

Source: Guidelines for Considering Noise in Land Use Planning and Control; U.S. Department of Transportation; June, 1980.

FIGURE 1



The decibel rating or value applied to sound or noise sources is a composite level arrived at by computing the Intensity of the noise, the Frequency, and the Distance from a noise source. All three of these variables are important indices in determining where a "noise" problem exists. All three variables can be manipulated technically, with current barrier and construction techniques, and buffer zones. They are consequently the three practical methods of application and consideration in land use planning:

1. The distance factor can be readily effective in land use planning. Perhaps the easiest way of reducing the negative impact from high noise sources is isolation from nearby noise sensitive areas by the use of distance buffer zones.
2. The intensity factor can be mitigated through conditional use permits directed towards dampening or attenuating the level of noise from high intensity sources. This can be done in many cases utilizing the principles of reflection, diffraction, and absorption characteristics of sound. Where state and federal agencies have preempted local control, the affected properties must be protected by zoning, general plan, and building codes from high intensity noise producers. This will be discussed in more detail in succeeding sections.
3. The frequency factor can be minimized since it is a measurement of the pitch of a sound wave, and therefore, subject to attenuation by equipment modification, barriers, insulation, and other techniques. Distance buffers are also very effective in mitigating the impact of objectionable frequencies.

The three variables are interdependent, in that: (1) intensity and frequency are no problem if a distance buffer is provided; (2) Distance can be lessened if intensity is lowered, and; (3) Distance and intensity can be of minor importance if the frequency is altered out of the sensitive range of the human ear.

In summary of the above discussion concerning the characteristics of noise that are important to the planning process, we see that:

1. Noise can be shielded by or reflected by large objects or barriers.
2. Wind, weather and terrain affect sound propagation.
3. Noise gets quieter with increasing distance from the source, but not at a linear rate. Doubling the distance only decreases the sound level by six dB, not by one-half.
4. Doubling the sound power will cause the sound pressure to increase by only three dB, and vice versa.

5. Ambient noise can vary with location, time of day and night and even by season.
6. Noise is not perceived in direct proportion to the sound level. A 10 dB change is perceived as twice as loud or half as loud.

For land use planning purposes, the Single Noise Event Level (SNEL), which is a decibel rating, is important but not entirely sufficient in assessing the whole noise situation in a given environment. The cumulative human exposure to environmental noise over long periods of time must be identified. This "total" of environmental noise exposure must use a measuring system which correlates with other measures, can be applied to most situations, and can be calculated and mapped representing energy equivalent noise levels over at least a 24 hour period. The term "environmental noise", which will be interchanged with "ambient noise level", means the existing background intensity, duration, and the character of sounds from all sources at any given location over a 24 hour or longer period. It is used in comparison with the next source of noise from a proposed project or in determining if a noise problem would result if a noise sensitive use is approved near a noise source.

A characteristic of environmental noise is that it is not steady. At any particular location the noise usually fluctuates considerably, from quiet at one instant to loud the next. Thus, one cannot simply say that the noise level at a given location is "so many decibels" unless a suitable method is used to average thetime-varying levels. To describe the noise completely requires that the "loudest" noises be given, how often they happen, and what the average noise levels are during what times of day.

The problem with attempting to evaluate the noise situation in a particular area with statistics derived from levels of noise at different times of a day or week or year is the large number of "readings" that will be accumulated. This mass of data would be literally impossible to be effectively used in an enforcement context or to map noise contours. Consequently, one should consider the noise levels at a given location over a period of time. A noise impact review should contain at least:

1. The ambient or background noise level broken down into time periods.
2. The time and duration of single noise events.
3. The equivalent noise exposure over a long period of time.

It is essential, therefore, to look further for a suitable single-number measure of noise exposure. Note that the ultimate goal is to characterize, with

reasonable accuracy, the noise exposure of whole neighborhoods or districts so as to prevent extremes of noise exposure at any given time, and to detect unfavorable trends in the future noise climate.

A number of methodologies for combining the noise from both individual events and quasi-steady state sources into measures of cumulative noise exposure have been developed and used by various governmental agencies. As long as the state and federal regulatory agencies use these different noise evaluation systems, local agencies will have to use them also for planning purposes.

In order to describe the affects of environmental noise in a simple, uniform, and appropriate way, that is also capable of graphic presentation, monitoring, and correlation with annoyance levels, the L_{eq}, and L_{dn} and CNEL systems were developed. The actual use of these systems is presented in the Implementation Section. At this point, the system will be explained.

The symbol L_{eq} is defined as the "long-term average sound level or equivalent sound level". The basic unit of L_{eq} is the A-weighted decibel for the purposes of this Noise Element. In simple terms, the L_{eq}, or equivalent sound level, is a method of attaching a numerical figure to the equivalent of the sounds produced in an area over a certain period of time.

Equivalent sound level is formulated in terms of the equivalent steady noise level which in a stated period of time would contain the same noise energy as the time varying noise during the same time period.

Each increase of 10 decibels sounds subjectively twice as loud to the human ear. However, if loud horns, sirens and trains occurred infrequently against a relatively quiet" ambient noise level", the l_{eq} for the 24 hour period would be relatively low. If they occurred frequently, say near a trainyard, fire station or busy intersection, the L_{eq} would be much higher because more noise energy has been generated. The L_{eq} number is an average of the sound energy. The sound energy contained in an eight hour exposure to 75 dB is equivalent to the energy contained in a twenty-four hour exposure to 70 dB. Examples:

a. An 80 dB horn added to an existing 80 dB train would increase the level of acoustic energy to 83 dB.

b. An 80 dB horn added to an existing 90 dB siren would increase the level to 90.4 dB.

c. Two sounds are produced. One emits half the energy of the other, but lasts twice as long. The two sounds would have the same equivalent sound level. This is called the equal-energy rule.

An individual in a twenty-four hour period may go from a relatively quiet residence to a noisier occupation situation and back to home again. During that twenty-four (24) hours he was exposed to a range of noise sources and intensity. His total exposure, or his L_{eq} (24) for the day, would be the average of the combined value of the sound energy to which he was exposed during that day. High intensity noise levels would raise the combined value of noise exposure while quieter levels would reduce the cumulative or equivalent sound energy.

Because of the levels being in terms of equivalency over a relatively long period of time, it can readily be seen that they are not completely useful in portraying very high noise levels of short duration. This fact is addressed and resolved in the implementation Section.

Once an L_{eq} number is established by formula, estimation from known sources or by actual noise equipment monitoring, it is possible to draw noise contours around the noise source with each contour being that number. For example, a continually running generator on a vacant flat plain with little wind could have concentric circle noise contours of 80 L_{eq}, 70 L_{eq}; 60 L_{eq}; etc. drawn around the motor. The background environmental noise in a vacant area might be stable, the generator puts out the same sound energy for 24 hours a day, the flat terrain means no reflection or absorption of sound as in hilly terrain, and the only loss of sound energy is the geometric spreading loss from the expansion of the sound wave over distance. Obviously these situations are rare. Usually, the noise contours which wind around a noise source look like the elevation contour lines on a U.S.G.S. map.

L_{eq} contours expressed in decibels (dB) are straight forward sound energy measurements. Earlier, it was mentioned that due to the characteristics of the human ear the A-weighted decibel (dBA) was developed to allow for what people can't hear. Noise contouring was also given a human variable; daytime versus nightime sound. Instead of L_{eq}, noise planning uses the Ldn or CNEL contouring systems. The dn simply means day-night. CNEL means Community Noise Equivalent Level. The two systems are nearly identical in numbers. Unfortunately, different governmental agencies use one or the other in their regulations.

The Ldn or CNEL contours utilize the L_{eq} levels but add another dimension. That is, in many cases there is a need for further weighting of sound levels to account for nighttime sound levels. Most noise environments are characterized by repetitive behavior from day to day, with some variation imposed by differences between weekday and weekend activity, as well as some seasonal variation. The major variation, however, is between day and night activities.

Typical communities have much lower ambient noise levels at night. The L_{dn} and CNEL systems account for this and are concerned with sleep interruption, speech interference, and associated annoyance levels. The effect of the weighting for the L_{dn} system may perhaps be more clearly visualized if it is thought of as a method that makes all levels measured at night 10 dB higher than they actually are. Thus, as an example, if the noise level is a constant 70 dB all day and a constant 60 dB all night, the L_{dn} would be 70 dB, because the nighttime 60 dB level had a 10 dB penalty weighting making it also 70 dB. The CNEL divides the day into three parts; daytime, evening, and nighttime. The three periods are daytime, 7 a.m. to 7 p.m.; evening, 7 p.m. to 10 p.m.' and nighttime, 10 p.m. to 7 a.m. A 5 dB differential is weighted during the evening rather than the 10 d in the L_{dn} system. The two systems are nearly identical in computation and the results differ only in tenths of a decibel.

III. Implementation.

This section will put in practical terms the general criteria to be used for acceptable noise levels in certain land use classifications, indicate why these criteria are used, and develop the procedure county staff may utilize to implement and enforce these criteria.

First, however, it is necessary to return to the general plan requirements for noise elements (see Introduction). The noise element shall recognize the guidelines established by the Office of Noise Control in the State Department of Health Services". These State guidelines are contained in Figure 2 and were utilized in the development of the acceptable noise level criteria by land use classification.

The next noise element requirement is to "...analyze and quantify, to the extent practicable,... current and projected noise levels for all of the following sources:

(1) Highways and Freeways and (2) Primary Arterials and Major Local Streets:

There are no freeways in Amador County. There are six State Highways (SR49, SR88, SR104, SR16, SR26, SR124). There are nine (9) primary arterials (Latrobe Rd., Plymouth-Shenandoah Rd., Fiddletown Rd., Ridge Rd., Climax Rd., Comanche Parkway North, Comanche Rd., Jackson Valley Rd. and Buena Vista Rd.). There are no local streets for which traffic counts are high enough to be concerned about in a noise element. In fact, because of the relatively low population and rural nature of Amador County, only certain segments of the identified state highways and county primary arterials are expected to have noise contours which require noise exposure land use regulations adjacent to them. These are identified on a County road map (Figure 3).

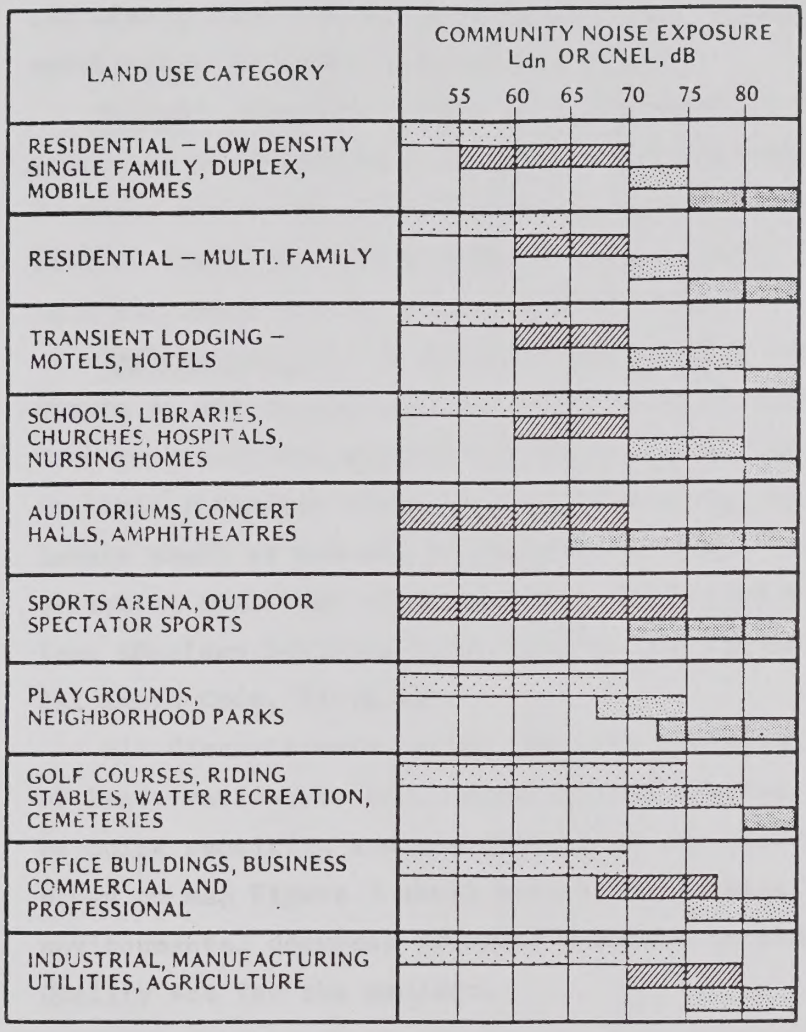
The California Department of Transportation (Caltrans) has developed noise contouring methodology for highways containing traffic volumes below 20,000 vehicles per day (ADT). The procedure specifies that noise levels within 100 feet of a highway where traffic speeds are less than 45 miles per hour will generally be less than 60 dB, L_{dn} beyond 100 feet. On roadways where speeds exceed 45 mph, noise levels of 60 dB, L_{dn}, out to 200 feet are found.

The Amador County Board of Supervisors and Local Transportation Commission have caused several traffic impact studies to be made in both incorporated and unincorporated communities in the County. These studies have revealed that growth in several locations will result in ADT's above 20,000 vehicles per day by the year 2000.

In the Martell-Sutter Hill corridors of SR 49 and SR 88 this projection is for over a 40,000 ADT. On other traffic corridor projections the estimates

Figure 2

LAND USE COMPATABILITY FOR COMMUNITY NOISE ENVIRONMENTS



INTERPRETATION

NORMALLY ACCEPTABLE

Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.

CONDITIONALLY ACCEPTABLE

New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.

NORMALLY UNACCEPTABLE

New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.

CLEARLY UNACCEPTABLE

New construction or development should generally not be undertaken.

CONSIDERATIONS IN DETERMINATION OF NOISE-COMPATIBLE LAND USE

A. NORMALIZED NOISE EXPOSURE INFORMATION DESIRED

Where sufficient data exists, evaluate land use suitability with respect to a "normalized" value of CNEL or L_{dn}. Normalized values are obtained by adding or subtracting the constants described in Table 1 to the measured or calculated value of CNEL or L_{dn}.

B. NOISE SOURCE CHARACTERISTICS

The land use-noise compatibility recommendations should be viewed in relation to the specific source of the noise. For example, aircraft and railroad noise is normally made up of higher single noise events than auto traffic but occurs less frequently. Therefore, different sources yielding the same composite noise exposure do not necessarily create the same noise environment. The State Aeronautics Act uses 65 dB CNEL as the criterion which airports must eventually meet to protect existing residential communities from unacceptable exposure to aircraft noise. In order to facilitate the purposes of the Act, one of which is to encourage land uses compatible with the 65 dB CNEL criterion wherever possible, and in order to facilitate the ability of airports to comply with the Act, residential uses located in Community Noise Exposure Areas greater than 65 dB should be discouraged and considered located within normally unacceptable areas.

C. SUITABLE INTERIOR ENVIRONMENTS

One objective of locating residential units relative to a known noise source is to maintain a suitable interior noise environment at no greater than 45 dB CNEL of L_{dn}. This requirement, coupled with the measured or calculated noise reduction performance of the type of structure under consideration, should govern the minimum acceptable distance to a noise source.

D. ACCEPTABLE OUTDOOR ENVIRONMENTS

Another consideration, which in some communities is an overriding factor, is the desire for an acceptable outdoor noise environment. When this is the case, more restrictive standards for land use compatibility, typically below the maximum considered "normally acceptable" for that land use category, may be appropriate.

are more speculative as growth trends are somewhat unpredictable. The fact remains that while current traffic volumes do not require traffic noise mitigation (e.g. the highest is a 14, 100 peak ADT at the Junction of SR 49 and SR 88 in Martell) there will be a traffic noise problem developing in the next 10-15 years.

While there is no way of eliminating existing noise sensitive incomplete land uses in these traffic corridors since they are existing state highways, the County (and Cities) must prevent new incompatible uses from being established in these high ADT corridors.

Policy: New development of residential or other noise sensitive uses shall not be permitted in traffic noise impacted areas as shown on map Figure 3 unless effective noise mitigation measures are incorporated into the project design to reduce exterior noise levels to L_{dn} 55dB or less and interior noise levels to L_{dn} 45dB or less.

Implementation: In the high ADT traffic corridors identified on map Figure 3, all residential or other noise sensitive building permits shall have an acoustical analysis which show that the structure has been designed to limit intrusive noise to a maximum of L_{dn} 45 dB or less. Exterior noise levels shall be reduced by distance buffers barrier walls or vegetation screening such that exterior noise levels are kept at or below L_{dn} 55 dB or less (Uniform Building Code, Chapter 35; California Noise Insulation Standards, Cal Admin Code, Title 25).

All discretionary review projects including use permits, rezones, divisions of land, variances, etc., which are determined at the initial study stage to be noise sensitive and are located in any high volume traffic corridor as shown on map Figure 3 shall have traffic noise studied and mitigated in any environmental document prepared pursuant to the California Environmental Quality Act for the project.

(3) Railroads and Rapid Transit Systems:

Amador County operates a small bus rapid transit system (ARTS) which does not substantially impact ADT volumes on its route. Consequently, no further discussion is necessary in a noise element.

There are two railroads in Amador County; the Amador Central Railroad from Martell to Ione and a Southern Pacific spur from Ione to mainlines in the delta area (map Figure 4). Neither of these railroads have enough traffic, nor are they expected to in the foreseeable future, to require noise contouring. In the event this current usage might change through unknown circumstances, the following policy is sufficient to address any potential

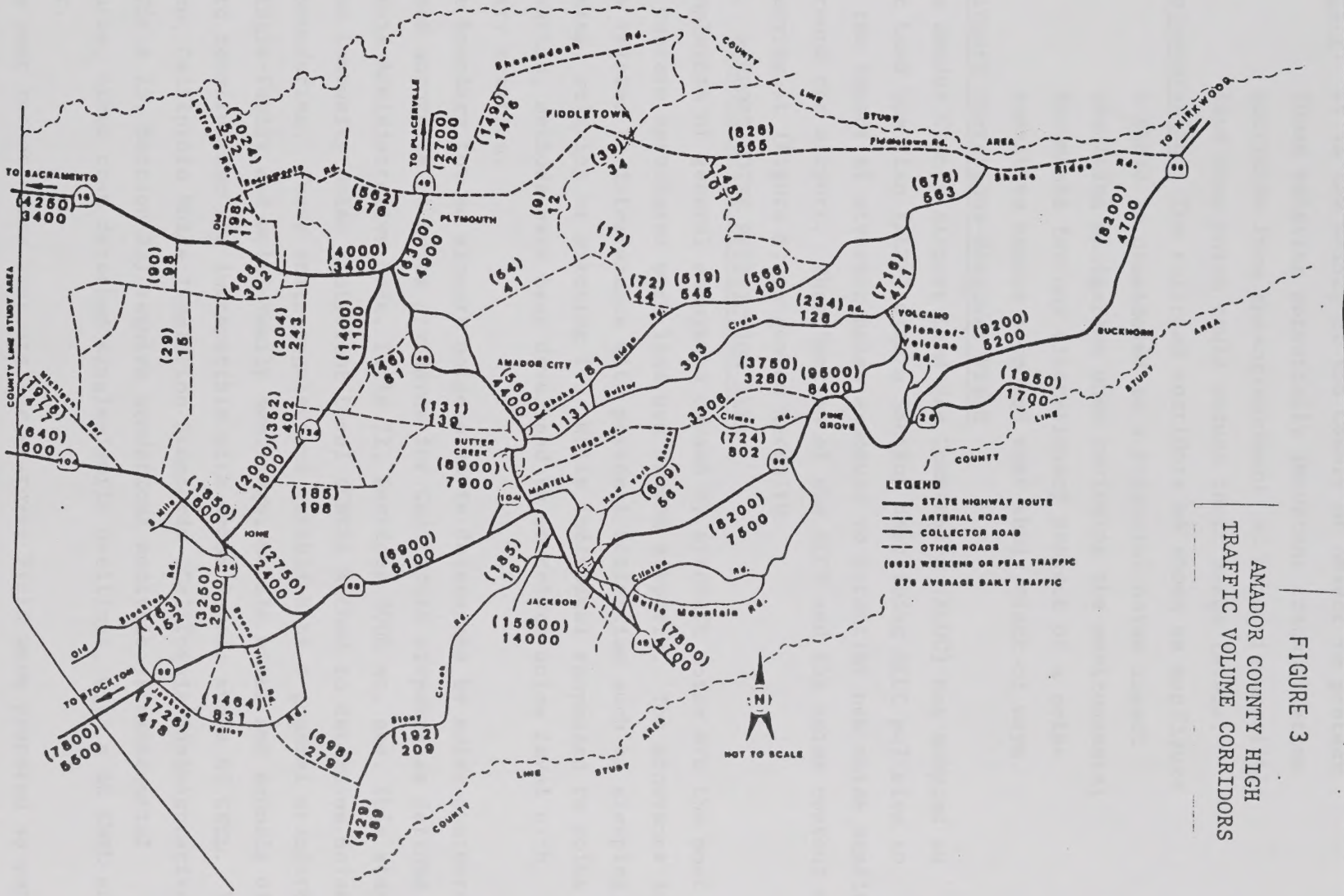


FIGURE 2 Existing Average Annual Daily Traffic (AADT) and Peak Month Daily Traffic.



expansion.

Policy: It is the policy of the County of Amador to protect these existing potentially important transportation corridors from the encroachment of major incompatible land uses which could reduce their usage levels.

Implementation: The railroad corridors as shown on map Figure 4 shall be considered as a potential noise impact requiring mitigation when reviewing the environmental documents for any discretionary project of a noise sensitive nature proposed near their right-of ways.

(4) Airport Operations-Westover Field

The Amador County Airport Land Use Commission (ALUC) has adopted an Airport Land Use Plan (ALUP) with a Section describing ALUC policies to reduce the impact of aircraft noise exposure to potential new noise sensitive uses around the airport. That Section of the ALUP and the noise contour map accompanying it (Figure 6) is quoted herewith:

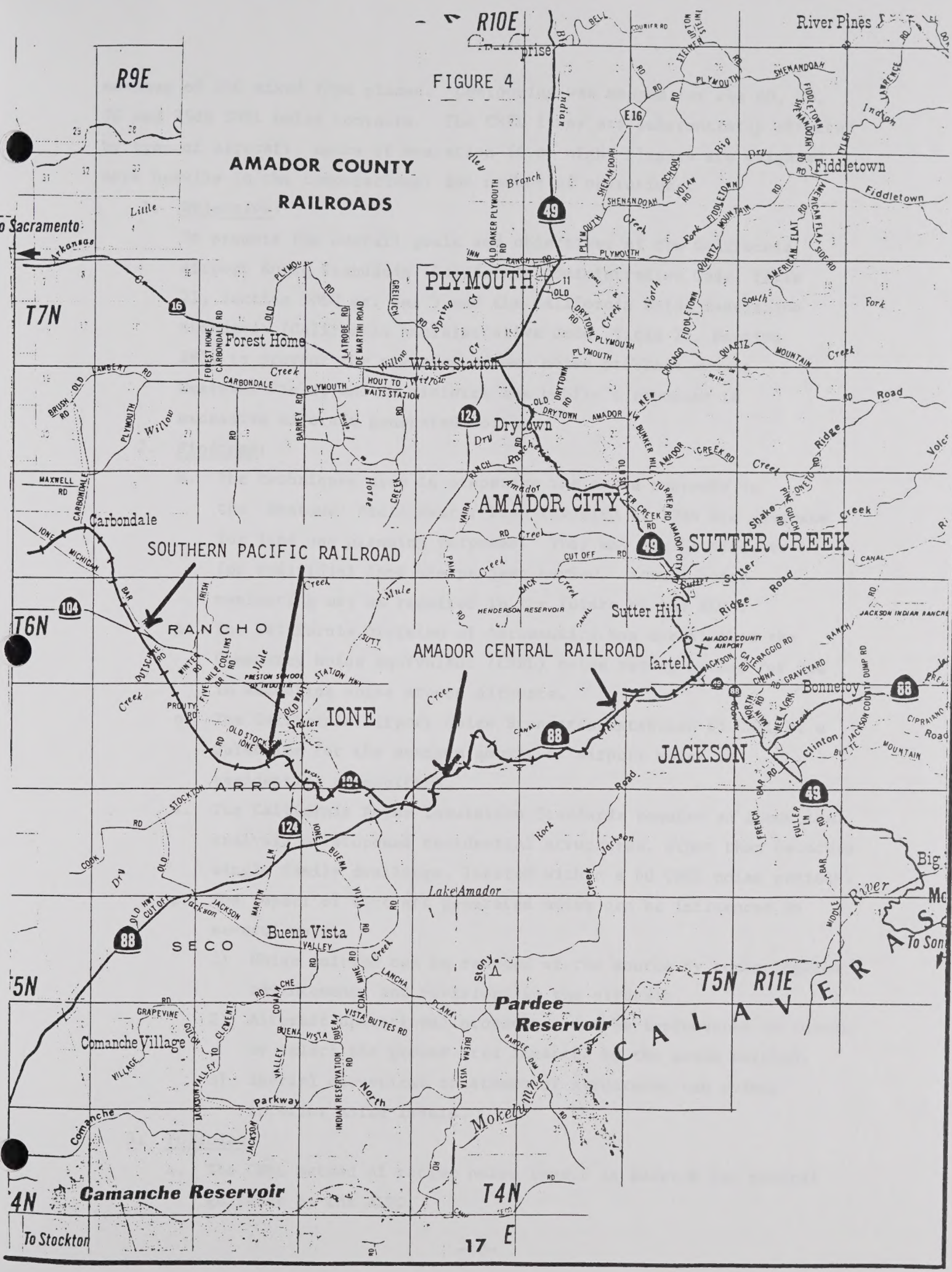
"B. AIRPORT NOISE RESTRICTION AREA

Complaints of general annoyance caused by aircraft noise are the most common concern associated with land use around airports. The annoyance is usually related to interference with personal activities such as sleeping, conversing, relaxing or watching TV. While individual responses to noise are quite varied, methods have been developed to correlate noise level with community reaction.

The boundary for an airport noise area is determined by noise contours developed according to noise standards for California airports as defined by California Administrative Code, Title 21, Sections 5000 et. seq. This standard uses the Community Noise Equivalent Level (CNEL) method to determine noise level boundaries. These state regulations establish as a general standard that single-family and multi-family dwellings, mobile homes and schools of standard construction are incompatible with noise levels above 65 CNEL. In addition, California Noise Insulation Standards (California Administrative Code, Title 25, Section 28) require acoustical analysis of residential structures, other than detached single-family dwellings, with a 60 CNEL noise contour.

The most recent noise contours for Westover Field were prepared as part of the 1986 Westover Field Airport Master Plan revision proposal. These CNEL noise contours were mathematically derived using a fixed base aircraft

FIGURE 4


AMADOR COUNTY
RAILROADS
SOUTHERN PACIFIC RAILROAD
AMADOR CENTRAL RAILROAD
R10E
R9E
T7N
T6N
T5N
T4N
T5N R11E
PLYMOUTH
Forest Home
Waits Station
Drytown
AMADOR CITY
SUTTER CREEK
Carbondale
RANCHO
IONE
ARROYO
SECO
JACKSON
Buena Vista
Comanche Village
Pardee Reservoir
Camanche Reservoir
Lake Amador
Sutter Hill
Martell
Bonnefoy
Fiddletown
River Pines
To Sacramento
To Stockton
CALAVERAS

maximum of 230 mixed type planes. Contouring was mapped for the 60, 65, 70 and 75dB CNEL noise contours. The CNEL lines are substantially effected by type of aircraft, hours of operation (i.e. night flights are weighted more heavily in the computations) and number of operations.

1. Objective:

   To promote the overall goals and objectives of the California Airport Noise Standards (California Administrative Code, Title 21, Section 5000 et. seq.) and the California Noise Insulation Standards (California Administrative Code, Title 25, Section 28), to prevent the creation of new noise problems around Westover Field, and to minimize the public's exposure to excessive aircraft generated noise.

2. Findings:

   a. The techniques used in preparing the noise contours in the Westover Field Master Plan revision of 1986 are adequate for land use planning purposes. They may not be adequate for individual land use project review. Actual noise monitoring may be required in the future by the ALUC.

   b. The California Division of Aeronautics has established the Community Noise Equivalent (CNEL) noise rating method for use in measuring noise around airports.

   c. The California Airport Noise Standards establish 65 CNEL as a guideline for the maximum amount of airport noise in residential communities.

   d. The California Noise Insulation Standards require an acoustical analysis of proposed residential structures, other than detached single family dwellings, located within a 60 CNEL noise contour.

   e. The impact of aircraft generated noise can be influenced in several ways:

      1) Noise emitted can be reduced at the source by technological advancements and revisions to the aircraft.

      2) Aircraft operational procedures can be implemented to reduce or select the ground area impacted by the noise emitted.

      3) Special acoustical treatment of structures can reduce interior noise levels.

3. Policies:

   a. The CNEL method of rating noise impact is adopted for general guidance by the ALUC.

b. The creation of new residential parcels within the 230 fixed base aircraft estimated 65 CNEL contour at Westover Field is not a noise-compatible land use. The construction of a single family dwelling on a parcel zoned for such use prior to the adoption of this element shall be considered a noise-compatible land use.

c. Within the 230 fixed base aircraft estimated 60 CNEL contour at Westover Field, all new residential structures shall be designed to limit intruding noise such that interior noise levels shall not exceed 45 CNEL in an habitable room.

d. The Land Use Compatibility Chart for Aircraft Noise, presented in Figure 5, is adopted as an aid for the general determination of noise compatible land uses in the area surrounding Westover Field.

4. Implementation of Airport Noise POlicies

a. Amador County and the Cities of Jackson and Sutter Creek should prepare and adopt an airport noise ordinance implementing ALUC noise standards for Westover Field. Until such time as these ordinances are in effect all residential proposed in the 230 fixed base aircraft estimated 60 CNEL shall be referred to the ALUC prior to issuance of the Building Permit.

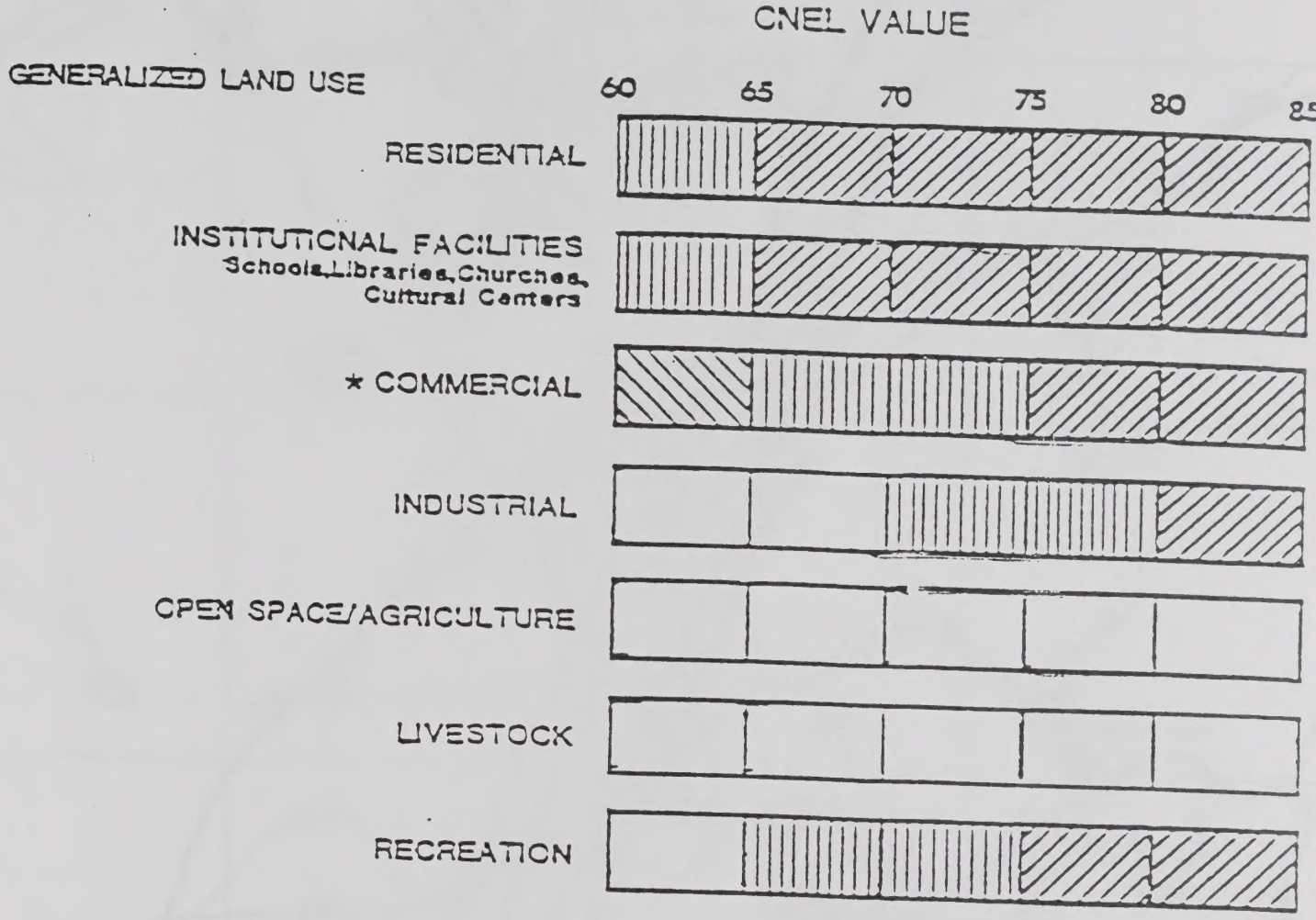
b. Within 65 CNEL noise contour restricting residential development established by this plan, Amador County and the Cities of Jackson and Sutter Creek shall submit for ALUC review any proposed land use changes including general plan or specific plan adoptions or amendments, prezonings, rezonings, use permits and variances for all new noise sensitive construction, including single family dwelling permits on parcels which were zoned for such use prior to the adoption of this element.

c. For any residential development occurring between the 55 CNEL noise contour and the 65 CNEL noise contour, Amador County and the Cities of Jackson and Sutter Creek shall evaluate the impact of aircraft noise on such development and require the implementation of appropriate mitigations measures such as noise insulation standards (mandatory within 60 CNEL contour) a buyer or lessee notification requirement to inform potential buyers or lessees of the exterior noise levels projected by the CNEL method at their property, and the attachment of a noise easement to title of all property sold in the areas affected by aircraft noise.

d. For existing residential development and future residential development allowed by this plan within the 65 CNEL contour, buyer notification programs, and noise easement acquisitions when possible are strongly recommended.

Figure 5

LAND USE COMPATIBILITY CHART FOR AIRCRAFT NOISE



SATISFACTORY

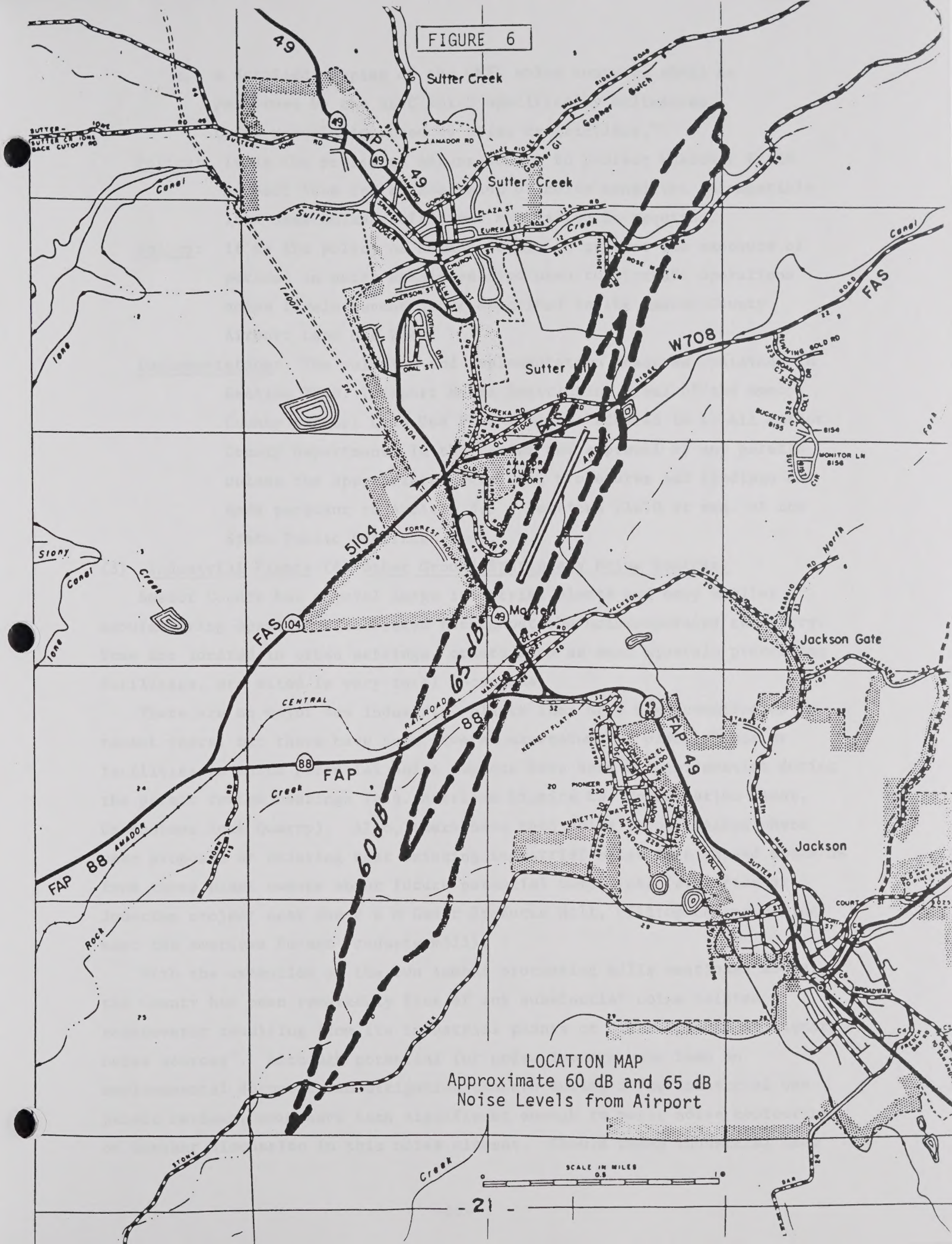
ALLOWABLE WITH NORMAL CONSTRUCTION, WINDOWS SEALED, FORCED AIR VENTILATION, OUTDOOR ACTIVITY MAY BE INTERRUPTED

CAUTION, NOISE INSULATION RECOMMENDED

INCOMPATIBLE LAND USE

* It is recommended that between 65 and 60 CNEL, noise insulation be incorporated into design and construction of those portions of the building area where the public is received, office areas, or where interior noise levels are generally low.




FIGURE 6
Sutter Creek
Amador City
Martell
Jackson Gate
Jackson
Sutter Hill
Amador County Airport
65 dB
60 dB
FAS 104
FAP 88
FAP 49
W708
5104
LOCATION MAP
Approximate 60 dB and 65 dB
Noise Levels from Airport

e. A detailed mapping of the CNEL noise contours shall be performed by the ALUC which specifically delineates those parcels impacted by noise restrictions."

Policy: It is the policy of Amador County to protect Westover Field Airport from the encroachment of noise sensitive incompatible land uses unless sufficient mitigation is required.

Policy: It is the policy of Amador County to prevent the exposure of persons in noise sensitive land uses to aircraft operations noise levels beyond those described in the Amador County Airport Land Use Plan.

Implementation: The policies and implementation measures contained in Section IV.B. (Airport Noise Restriction Area) of the Amador County Airport Land Use Plan shall be adhered to by all Amador County departments in the review and approval of any permits unless the appropriate decisions, procedures and findings are made pursuant to Article 3.5 Sections 21670 et seq. of the State Public Utilities Code.

(5) Industrial Plants (6) Other Ground Stationary Noise Sources:

Amador County has several large industrial plants and many smaller manufacturing operations scattered throughout the unincorporated territory. Some are located in urban settings, others such as most minerals processing facilities, are sited in very rural locations.

There are no major new industrial plants that have been constructed in recent years, but there have been several expansions of older plants or facilities in which potential noise impacts have been a consideration during the permit review hearings (e.g. American Lignite Co. Cogeneration Plant, Greenstone Rock Quarry). Also, there have been noise issues raised where uses proposed or existing near existing industrial sites have raised concerns from those plant owners about future potential complaints (e.g. Pioneer Junction project near the P & M Cedar Products Mill, Hilltop Center project near the American Forest Products mill).

With the exception of the two lumber processing mills mentioned above, the County has been remarkably free of any substantial noise related controversy resulting from its industrial plants or other "ground stationary noise sources". Although potential for noise impacts have been an environmental document and mitigation concern during a few industrial use permit reviews, none have been significant enough to merit noise contouring or further discussion in this noise element. Should these industrial uses

become a source of future noise complaints over any exceeding of their mandatory noise level conditions of approval, the more appropriate correction procedure is enforcement or permit revocation. The conditions of approval regarding noise mitigation were intended to make the new use both compatible with existing adjacent land uses as well as be consistent with the area general plan designations for future uses.

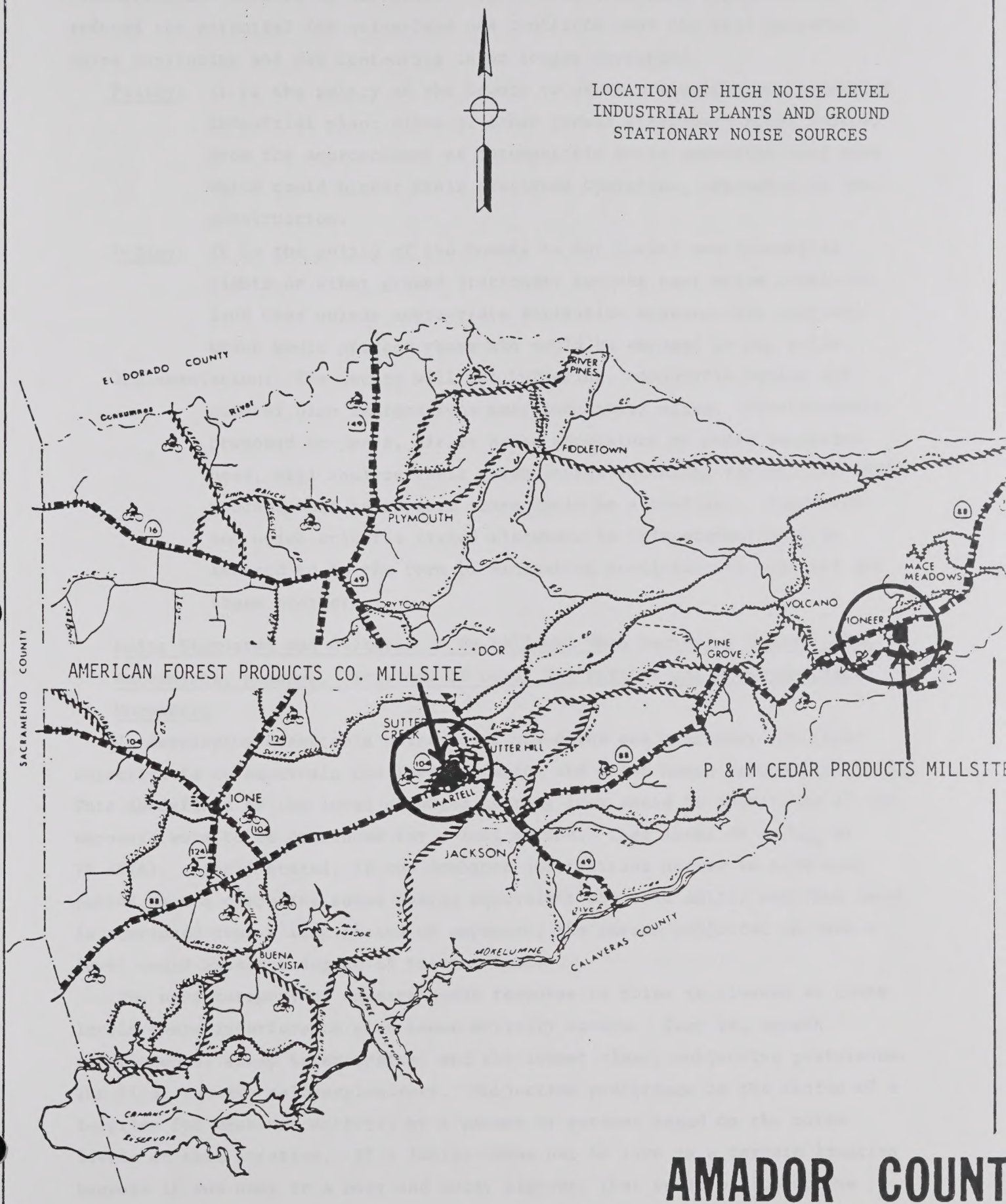
The noise related debates with the two lumber mills have not for the most part been over their own operations. The controversies have instead arisen when nearby landowners have applied for noise sensitive projects which, in the opinion of the mill owners, could subject them to future noise complaints about their operations. They were very concerned about new incompatible residential uses encroaching near their facilities and eventually attempting to force changes in their operations.

In 1980, a large mixed residential-commercial project, called Pioneer Junction, was proposed adjacent to the P & M Cedar Products mill in Pioneer (map Figure 7). The mill owners expressed their concerns at the public hearing about the potential for future residents of this project to start complaining about the mill; including noise, lights, dust, etc. The project was ultimately denied because of their concern. Most of the general plan and zoning near this mill was subsequently designated to the more compatible commercial or light industrial classifications. While there will probably remain for quite some time pre-existing, nonconforming residences near this mill from which noise complaints will arise, the County believes all that can practically be done to reduce these conflicts has been accomplished. A noise contour study would be redundant.

A similar situation developed in 1984 in the Martell area when a mixed residential-commercial project, Hilltop Center, was proposed near the American Forest Products mill site. The mill owners expressed concern that future residents would eventually complain about several facets of their operations. They requested the County to adopt a buffer of no incompatible land uses near the mill. Also, they began to take notice of their other property boundaries to see any other incompatible zoning or general plan classifications that might exist.

The County approved the Hilltop Center project, but required a 1500 foot no residential use buffer zone on the plans to protect the mill. In 1986, the County revised the Land Use Element map of the General Plan for the Sutter Creek-Martell-Jackson urbanized area. The mill site (450±; map Figure 7) was given commercial, industrial and low density agricultural

FIGURE 7


LOCATION OF HIGH NOISE LEVEL
INDUSTRIAL PLANTS AND GROUND
STATIONARY NOISE SOURCES
EL DORADO COUNTY
Consumnes River
RIVER PINES
FIDDLETOWN
PLYMOUTH
DRYTOWN
DOR
MACE MEADOWS
VOLCANO
PINE GROVE
IONEER
AMERICAN FOREST PRODUCTS CO. MILLSITE
P & M CEDAR PRODUCTS MILLSITE
SACRAMENTO COUNTY
SUTTER CREEK
SUTTER HILL
MARTELL
IONE
JACKSON
BUENA VISTA
MOKELUMNE
CALAVERAS COUNTY
AMADOR COUNT



classification buffers on all sides. These decisions have significantly reduced the potential for noise-land use conflicts near the mill property. Noise monitoring and map contouring is no longer warranted.

Policy: It is the policy of the County to protect existing and potential industrial plant sites or other ground stationary noise sources from the encroachment of incompatible noise sensitive land uses which could hinder their continued operation, expansion or new construction.

Policy: It is the policy of the County to not locate new industrial plants or other ground stationary sources near noise sensitive land uses unless appropriate mitigation measures are required which would protect those who would be exposed to the noise.

Implementation: The County will use buffering, compatible zoning and general plan designations near industrial sites. Discretionary proposed projects, either noise generators or noise sensitive uses, will analyze their noise impact potential through the CEQA process when it appears there could be a conflict. Standards and noise criteria listed elsewhere in this element will be adhered to in the form of mitigating conditions of approval for these projects.

Noise Standards and Criteria To Be Followed When Reviewing General Plan Amendments, Rezones, Divisions of Land; Use Permits and Environmental Documents

In developing acceptable noise level standards and criteria, the first objective is to ascertain the level at which the worst human response is found. This is defined as the level at which hearing loss would be inevitable if the exposure were to be continued for a long period. That level is an L_{eq} of 70 dB(A). Simply stated, if the combined intermittant noises in a 24 hour period have a composite sound energy equivalent above 70 dB(A), and this level is continued over a long period of exposure, the person subjected to such a level could expect a degree of hearing loss.

The next category of adverse human response to noise is classed as those levels where interference with human activity occurs. That is, speech interference, sleep interruption, and the lowest class, subjective preference. The first two are self-explanatory. Subjective preference is the choice of a location for whatever activity by a person or persons based on the noise levels at that location. If a family chose not to live in a certain location because it was next to a busy and noisy highway, that would be subjective preference. They "preferred" to live somewhere else not so noisy.

The topic of subjective preference is a broad area of debate. A person may enjoy loud levels of music, yet dislike a less noisy freeway near his home. Consequently, the concept of equivalent noise level exposure related to annoyance levels is applied only to involuntary exposure. This does not discount the possibility, however, that the combination of the two exposures, voluntary and involuntary, might affect hearing capability where each noise source alone would have no effect.

Also to be considered in talking about subjective preference is the effect noise exposure has on the ability to concentrate, ability to relax, proneness to irritability and similar physiological disturbance or sleep interruption as it is almost impossible to cover all of the variations in mans activities that can be affected by high background noise levels.

Speech interference, however, is quantifiable. Speech communication within a building having an L_{eq} of 45 dB(A) is 100% intelligible for the majority of the populace. For outdoor voice communication, an L_{eq} of 60 dB(A) is the optimum outdoor level. Allowing for the average 15 dB(A) reduction of sound energy by an average home, a 55 dB(A) outdoor level would indicate a 40 dB(A) indoor level which would be desirable for easy communication.

Speech interference is the primary cause of annoyance and source of community complaints unless sleep interruption also occurs. Sleep interruption is given as the most annoying result of exposure to high noise levels. It is also the cause of the most vociferous complaints and legal action. Whereas speech communication is possible by talking louder, moving closer, turning up the radio or T.V., etc., no such relief is possible with sleep interruption.

The interference with sleep is on two levels. One is where the noise levels actually prevent sleep. The other is where the affected person is asleep and the noise levels, especially intermittant or impulsive noises, are causing subconscious reactions such as increased adrenalin flow, faster heartbeat and breathing, and other undesirable involuntary physiological reactions.

The L_{dn} system of rating noise levels is perhaps the most satisfactory method of insuring night time noise levels will be lower to aid in preventing sleep interruption. The 10 dB(A) penalty weighting added during nighttime hours in residential areas will bring the ambient noise level near enough to the optimum 32 dB(A) level for sleep.

In summary of the above statements we find that:

(a) An L_{eq} above 70 dB(A) will result in hearing loss to residents of a community thus exposed for an extended period of time.

(b) Speech interference, an annoyance rating, occurs outdoors at 55 dB(A), and indoors at levels above 45 dB(A)

(c) Sleep interruption can occur above 45 dB(A), but is not normally a problem at 32 dB(A).

In reviewing these noise levels recall the points brought out previously in the characteristics of sound. That is, decibels are derived from a logarithmic scale. The higher the numerical value, the higher the noise is but not in an arithmetic ratio. The difference bewtween 32 db(A) and 45 dB(A) is not as great in terms of magnitude as the same thirteen (13) decibel increase in the 80 or 90 dB range. However, any intermittant or impulsive noises at the lower decibel levels is much more noticeable than at the higher levels.

It is also important to remember that the noise contours developed from the L_{eq} system represent noise equivalency totals per a 24 hour period. They do not portray the situation where high levels of noise for very short durations are present from a noise source. In other words, they are applicable in determining ambient levels of environmental noise in a given area where steady, repretitive noise sources are present. Highway, railroads, airports, and some industrial land uses, on the other hand, are not so easily fitted into a contour system. Also, if they were so graphically displayed, those noise isolines might not be able to reflect the real noise situation that might be created with a particular type of noise emission.

An example would be a home near a busy highway. Over a 24-hour period the equivalent sound level could very well be below 55 dB(A). This would especially be true with periods of little traffic at night. Yet, at certain times during the day heavy truck traffic might pass the home with intermittent noise levels of over 80 dB(A) for short durations. The periods of relative quiet would "average out" the short durations of high noise levels. However, that truck traffic might be very annoying to the exposed person.

This is true for several types of land uses such as airports, commercial or industrial areas, railroads, and so forth. Dogs barking, children playing, or lawn mowers might bring the same annoyances. The sound energy equivalent contours are useful as guides for generalized planning purposes, but a review of possible intermittent high noise levels of short duration are also

necessary in evaluating possible noise problems. The L_{eq} contours give a good indication of the ambient or background noise levels that can be expected over extended periods of time. They can also be mapped as a planning aid for large areas. Specific locations and individual projects would require more research into any possible individual noise incompatibilities.

For this reason the following guidelines on land use classification are general use only. Specific projects and specific areas shall be treated on an individual basis within the general criteria and paramenters outlined in this Noise Element. Noise monitoring and other circumstances might more precisely indicate a problem than apparent from the L_{eq}, L_{dn}, or CNEL scales on a particular project. For this reason the CEQA review process plays an important role in project decision-making.

Noise level standards and criteria must be viewed from two perspectives when either reviewing specific project applications or when reclassifying areas for future land uses: 1) The noise sources or generators, and; 2) The noise receptor sensitive land uses. Standards applied to the noise generators are designed to restrict or at least ensure acceptable levels of the amount of noise they make. Standards adopted for noise receptors are meant to reduce the exposure to noise persons may come in contact with at a particular location.

These standards are usually only in conflict with each other when they are proposed to be located near each other. For that reason, the criteria must be established from both perspectives and a policy adopted describing the County review procedure when the two overlap. The following criteria policies and standards of implementation will cause the two to be compatible with each other:

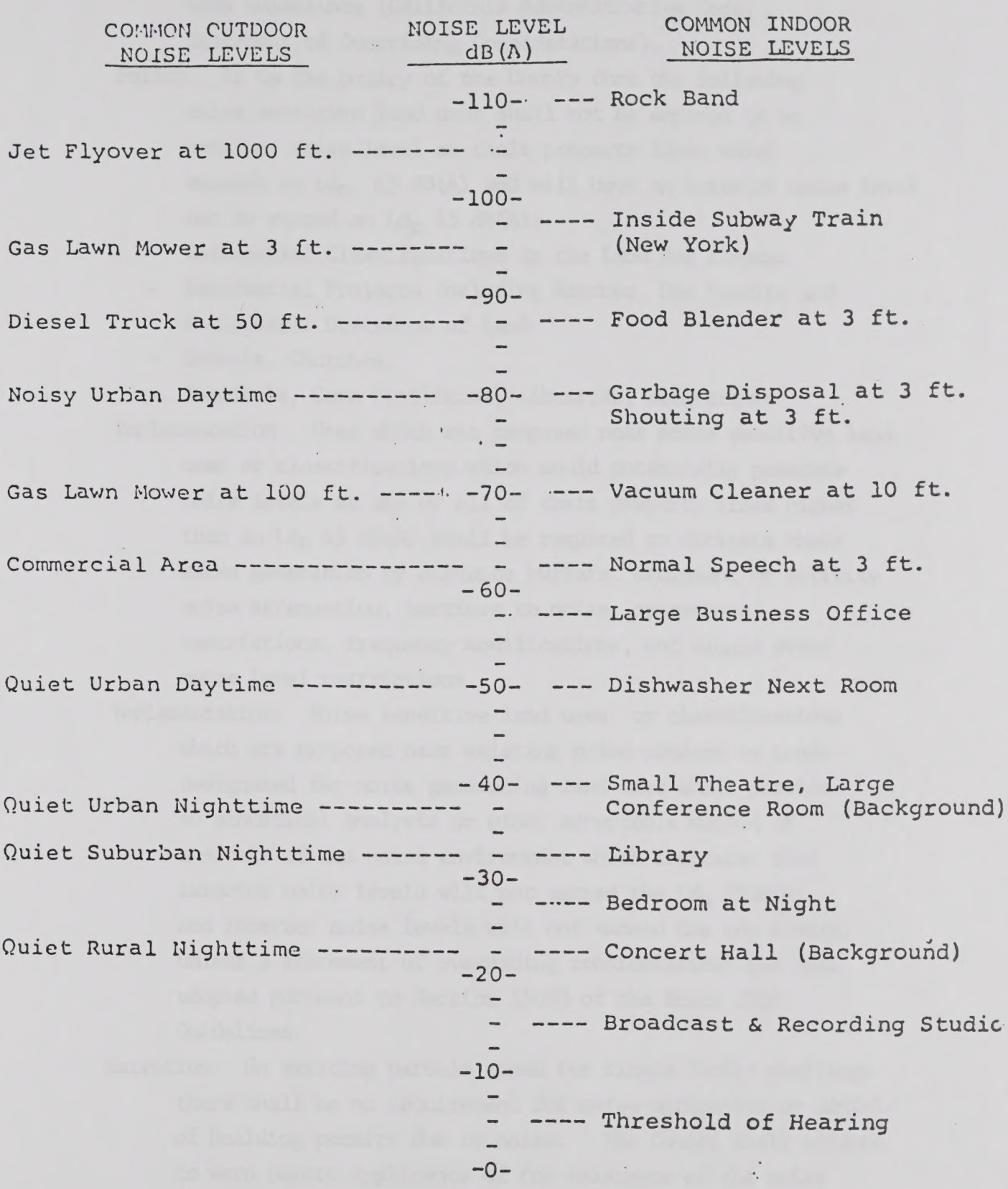
Policy: It is the policy of the County to prevent the encroachment of noise sources into areas designated for existing or future noise sensitive land uses.

Policy: It is the policy of the County to prevent the encroachment of noise sensitive land uses into areas designated for use by existing or future noise generators.

Implementation: a) Any required noise monitoring shall be taken and any required noise mitigation conditions shall be adopted at the property line bewteen the noise source and the noise sensitive land uses. Noise level standards shall not be exceeded unless found to be acceptable pursuant to Section 15093 of the State

FIGURE 8

COMMON NOISE LEVELS



SOURCE: "Guide on Evaluation and Attenuation of Traffic Noise", American Association of State Highway and Transportation Officials.

NOTE: A ten (10) decibel increase in sound level on dB(A) scale doubles the apparent loudness or annoyance of the sound.

CEQA Guidelines (California Administrative Code; Statement of Overriding Considerations).

Policy: It is the policy of the County that the following noise sensitive land uses shall not be exposed to an exterior noise level at their property lines which exceeds an Ld_n 65 dB(A) and will have an interior noise level not to exceed an Ld_n 45 dB(A);

- Residential Classifications in the Land Use Element
- Residential Projects Including Rezones, Use Permits and Residential Divisions of Land
- Schools, Churches,
- Hospitals, Care Facilities, Libraries, Auditoriums

Implementation: Uses which are proposed near noise sensitive land uses or classifications which could potentially generate noise levels at any or all of their property lines higher than an Ld_n 65 dB(A) shall be required to mitigate their noise generation by distance buffers, equipment or activity noise attenuation, barriers to noise, operational restrictions, frequency modifications, and single event noise level restrictions.

Implementation: Noise sensitive land uses, or classifications which are proposed near existing noise sources on lands designated for noise generating land uses shall provide an acoustical analysis or other acceptable method of analysis of the noise environment which indicates that exterior noise levels will not exceed the Ld_n 55dB(A) and interior noise levels will not exceed the Ld_n 45dB(A) unless a statement of overriding considerations has been adopted pursuant to Section 15093 of the State CEQA Guidelines.

Exception: On existing parcels zoned for single family dwellings there shall be no requirement for noise mitigation or denials of building permits due to noise. The County shall attempt to warn permit applicants of the existence of the noise source and existing or projected noise levels which could adversely affect the dwelling.

Implementation: The following additional standards shall be applied to any noise generating projects at their

property lines unless otherwise mitigated or found acceptable pursuant to Section 15093 of the State CEQA Guidelines:

a) All noise level measurements shall be taken on noise monitoring equipment found to be acceptable by the County and by a person(s) qualified to take noise level readings.

b) Noise level readings are to be read on the A scale at the slow response unless more accurate methods such as octave band analysis are required.

c) The noise level contributed by a proposed noise generating project to adjoining properties identified by the County as being noise sensitive shall not raise the existing ambient noise level at the property line beyond the following levels unless a statement of overriding considerations has been adopted pursuant to Section 15093 of the State CEQA Guidelines or other acceptable mitigation measures have been incorporated into the project.

Existing Ambient Noise Level	Allowed Increase
Ld_n 55 dB(A)	Ld_n 3dB(A)
Ld_n 60 dB(A)	Ld_n 2dB(A)
Ld_n 65 dB(A)	Ld_n 1dB(A)

d) The Amador County Planning Department shall determine the ambient background level. If necessary, a noise consultant may be contracted for by the County at the expense of whomever intiated the project under review.

e) The 24 hour Ld_n noise level standards measured at the property line of a noise generator shall also not be exceeded on a per hour basis beyond the following levels:

Cumulative period of 30 minutes per hour-------0
Cumulative period of 15 minutes per hour------+5
Cumulative period of 5 minutes per hour------+10

Cumulative period of 1 minute per hour--------+15

Level not be exceeded for any time per hour except----------+20

for impulse or intermittent noise in f) below.

f) Intermittant of impulse noise level maximum to be measured at a noise generators property line:

25 Micro-Seconds

Impulse Duration	or less	One Second	One Second	One Second
Number of Impulses Per Day	1	1	10	100
Maximum Noise Level	167dB(A)	145dB(A)	135dB(A)	125dB(A)-85dB

g) Blasting noise levels (peak pressures) shall not exceed the standards recommended in U.S. Bureau of Mines publication RI8485. Vibration from blasting shall not exceed the standards recommended in U.S. Bureau of Mines publication RI8508. Lower blasting and vibration standards may be mandated through the CEQA process on individual discretionary projects. *

Implementation: The policies and implementation measures contained in this noise element shall become an integral part of any decisions made revising or amending the circulation and land use elements of the Amador County General Plan.

* Note: In the event the U.S. Bureau of Mines revises these publications or updates them with new publications any new standards or criteria shall automatically become effective in this noise element without further action by the County.

APPENDIX - Definitions

Ambient Noise Level:	The composite of noise from all sources near and far. In this context, the ambient noise level constitutes the normal for existing level of environmental noise at a given location.
A-weighted Sound Level:	The sound pressure level in decibels as measured on a sound meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the response of the human ear and gives good correlation with subjective reactions to noise.
CNEL:	Community Noise Equivalent Level. The average equivalent A-weighted sound level during a 24-hour day, obtained after addition of five decibels to sound levels in the evening from 7:00 p.m. to 10:00 p.m. and after the addition of ten decibels to sound levels in the night after 10:00 p.m. and before 7:00 a.m.*
Decibel, dB:	A unit for describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micripascals (20 micronewtons per square meter).
Equivalent Energy Level, Leq:	The sound level corresponding to a steady-state A-weighted sound level containing the same total energy as a time-varying signal over a given sample period. Leq is typically computed over 1, 8, and 24 hour sample periods.
LDN:	Day-Night Average Level. The average equivalent A-weighted sound level during a 24-hour day, obtained after addition of 10 decibels to sound levels in the night after 10 p.m. and before 7:00 a.m.*
Lmax:	The maximum A-weighted noise level recorded during a noise event.

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*CNEL and LDN represent daily levels of noise exposure average on an annual basis, while Leq represents the equivalent energy exposure for a shorter time period, typically one hour.

Noise Exposure Contours: Lines drawn about a noise source indicating constant energy levels of noise exposure. CNEL and LDN are the the metrics use herein to describe community exposure to noise.

Single Event Noise Exposure Level (SNEL): The level of noise accumulated during a single noise event, such as an aircraft overflight, with reference to a duration of one second. More specifically, it is the level of the time-integrated A-weighted squared sound pressure for a stated time interval or event, based on the reference pressure of 20 micropascals and a reference duration of one second. Also described as Sound Exposure Level (SEL).

Property Line: For the purpose of this element of the general plan "property line", where noise measurements and policies are implemented, shall exclude road right-of-way easements. If no easement or right-of-way exists the "property line" shall be considered to be a line fifty feet from the centerline of the improved road.

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